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ABSTRACT

Each year when the Educational Testing Services releases state average SAT (Scholastic Aptitude Test) scores of high school students, Indiana officials are asked why Indiana ranks so low and what's being done to improve it. Leaders reply that scores are lower because more students take the test than in states with higher scores. This report summarizes what can be learned from Indian's average SAT scores and what cautions are necessary to reach meaningful conclusions about the educational performance of Indiana students. Indiana high school seniors' average verbal-math SAT scores have historically ranked in the bottom one-third of the states. Two sources of bias that distort and lower Indiana students' average SAT scores are described--the varying rates of SAT participation among states, and differences among states' educational resources. It is argued that SAT scores offer a limited measurement of college-bound high school seniors' verbal and mathematics achievement, and do not accurately represent the state's educational performance. In addition, the SAT is used as a measure of student achievement, although its purpose is to assist colleges in making admissions decisions. Three different ways of reporting SAT scores are explained. It is concluded that the relative performance of Indiana's college-bound high school seniors improves in comparison to other states, once corrections are made. An education-performance report card is needed to provide a comprehensive and informative view of Indiana education. (LMI)

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What Do SAT Scores Say about Indiana's Education Performance?

by

Robert G. Lehnen

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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Introduction

An annual ritual occurs in Indiana each time the Educational Testing Service of Princeton, New Jersey, releases state average SAT scores of high school students for verbal and mathematics achievement. Indiana school officials are asked why Indiana ranks so low among the states, and what is being done to improve education performance. School leaders reply that the SAT scores are lower because more students in Indiana take the test than in states with higher scores, and that programs designed to improve Indiana's test scores are in place. Some Hoosiers react by saying that schools need to improve, while others discount the Indiana SAT test results as another example of an inappropriate, if not misleading, measure of student achievement. What makes this annual ritual difficult to understand for many citizens interested in the performance of Indiana schools is that both parties are correct. The SAT does provide some useful information about the performance of Indiana's students, but without significant qualification and interpretation it also is a misleading indication of education performance in the Hoosier state. This report summarizes what one can learn from state average SAT scores and what cautions are necessary to reach meaningful conclusions about the education performance of Indiana's students.

What the SAT Tells Us About Indiana

Indiana has historically ranked in the bottom one-third of the states in the average verbal-math SAT scores of its high school seniors. In 1992 Indiana ranked 47th among the 50 states and the District of Columbia.

Indiana's relative position on the SAT among the states has remained about the same since 1972, the earliest year for which SAT scores are available,

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Table 1

Indiana Average SAT Scores, 1972-1992

Year	Average Verbal-Math Score	State Rank	Cream of the Crop Adjusted Rank	Resources and Cream of the Crop Adjusted Rank
1992	868	47		
1991	865	47		
1990	867	47		
*1989	871	47	36	26
*1988	870	47	38	30
*1987	874	47	38	29.5
*1986	874	47	36	29.5
*1985	875	47	36	24.5
*1984	864	47	36	28
1983	865	46		
*1982	860	46	35	28
1981	857	46		
1980	858	47		
1979	867	46		
1978	870	46		
1977	870	47		
1976	875	47		
1975	881	46		
1974	892	46		
1973	899	44		
1972	906	45		

*Note: Adjustments made for years where ACT data are available.

even though national SAT average scores have declined during the last 20 years (See Table 1).

Does this rather low relative performance on an achievement test mean that Indiana's school-aged population has poor education performance? The answer is, "Not necessarily." The current practice of reporting these average test scores introduces two known sources of bias that distort and lower the average test scores of Hoosier high school students when compared to other states. These two biases are the result of varying SAT participation rates and the different resources invested in state education systems.

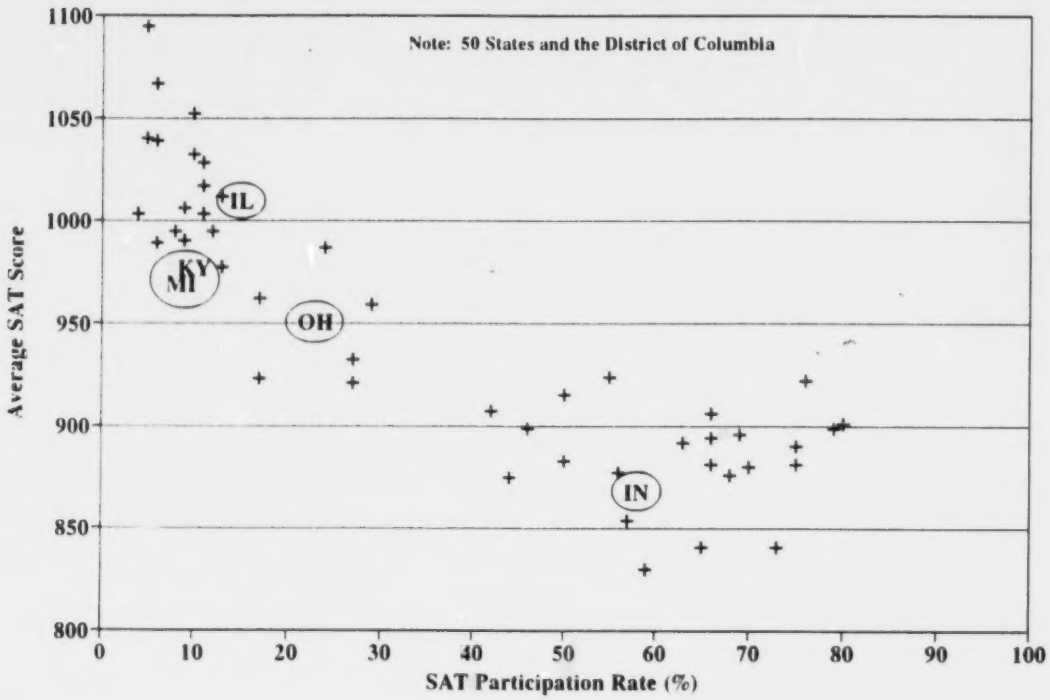
The Effects of SAT Participation

In a 1985 *Harvard Education Review* research article Powell and Steelman (1984) documented that the average state SAT score decreases as a larger percentage of students take the SAT. In other words, when smaller percentages of students, usually higher achievers, take the test, the average test score in the state will be higher. The pattern observed by Powell and Steelman is illustrated in Figure 1, which shows the relationship between the percent of eligible students taking the test and the average state SAT score for 1992.

This pattern may be called the "cream of the crop" phenomena, since the evidence suggests that the more academically talented and high achieving high school students are likely to take the SAT for college admission first, and these test takers are not typical of the student body of eligible students. The other national verbal-math achievement test used for college admission decisions (besides the SAT) is the ACT. The SAT is the test of choice in 22 states including Indiana, and the ACT in 28 states.[1] Since more than half of the states (28) have low percentages of eligible students taking the SAT (students in these states usually take the ACT), the average SAT scores from these states will be artificially inflated, while in the 22 SAT states, the average test scores will be lower because a more representative cross-section of eligible students take the test. The states adjacent to Indiana—Michigan, Illinois, Kentucky, and Ohio—historically have had SAT scores higher than Indiana, because students in these states are more likely to take the ACT for college admission and thus only a small percentage

Figure 1

Average SAT Scores by SAT Participation Rate



take the SAT. In summary, the "cream of the crop" tends to take the SAT in 28 ACT states, whereas a more representative proportion of students take the SAT in 22 states, including Indiana.

The SAT States Are Better Positioned to Support Education

The 22 SAT states differ in another significant way from the 28 ACT states. The SAT states invest more resources into their education systems and have more favorable social-economic conditions for education than the 28 ACT states. The SAT states tend to have less poverty, higher personal incomes, higher education spending per pupil, and smaller pupil/teacher ratios than the ACT states. Since money, class size, lack of poverty and high personal income are each related to improved performance of the SAT, these different resource and socio-economic conditions in the states must be considered in order to compare SAT averages among the states.

In a recent *Policy Studies Journal* article (Lehnen, 1992) the author found that these resource and funding variations accounted for differences between the SAT and ACT states from 23 to 38 SAT points. This is a sizeable difference in average SAT scores if one recognizes that Indiana's average SAT score usually fluctuates less than 5 points from year to year. If one compares ACT and SAT states directly, without adjusting for these differences, Indiana's average test scores are 13 to 30 test score points lower than the ACT states.

What Can We Learn about Education Performance from SAT Scores

To compare average SAT scores among the states, one must understand which students take the SAT and what the test actually measures about student performance. Not all Hoosier students take the SAT. In fact, the SAT reports average test scores for high school seniors who may wish to attend college. The SAT does not measure the

performance of students in the lower grades (K through 11), nor for students unlikely to enroll in higher education. The education performance of students who do not attend college, who enter the military or the workforce, or who drop out of high school is not measured by SAT scores. The group measured by average SAT scores then is "college-bound high school seniors." When a sufficiently large percentage of this group, about 30% or more of eligible students, takes the SAT, one can obtain a reasonable estimate of their education performance. But what *kind* of education performance is measured by the SAT?

The SAT is an achievement test that primarily measures verbal and math achievement, including reading comprehension, vocabulary, math computation, and math problem solving. The basic test does not directly measure learning in social studies or in the arts and humanities areas, nor does it measure higher-order reasoning, group problem-solving, workforce readiness skills, citizenship, and other knowledge taught in grades K-12. Most importantly, the SAT does not necessarily reflect the unique and varied curriculum in each of the states—that is, what the students are actually taught even in the areas of verbal and math achievement. The reason is that the SAT was never designed to be a measure of education performance. Rather the sole purpose of the SAT is as a tool used by some colleges and universities to assist them in making admission decisions. Although the SAT is *used* as a measure of student achievement, its *purpose* has always been as an aid to college admissions decisions. The SAT then is a limited measure of education achievement in verbal and math areas of college-bound high school students.

A Revised View of Indiana's SAT Performance

The ranking of Indiana's college-bound high school seniors at about 47th among the states is artificially low in light of the "cream of the crop" phenomena and differences in education input resources available to the states. But how favorably do Indiana's college-bound high school seniors compare once these differences are accounted for? The following table summarizes three different ways of reporting state average SAT scores.[2]

Table 2

Methods of Reporting SAT Scores
by Type of Adjustment

Methods of Reporting	"Cream of the Crop" Problem	Input Resource Differences
Average SAT test score reported by the Educational Testing Service	No correction made	No correction made
Adjusted for self-selection only	correction made	No correction made
Adjusted for resource inputs and self-selection	correction made	correction made

Indiana's ranks based on these three methods of reporting SAT achievement test results are summarized in Table 1. The main point of Table 1 is that the *relative* performance of Indiana's college-bound high school seniors improves in comparison to other states once corrections are made, since Indiana moves from a rank of 47th among the states to a rank varying between 24th and 38th, depending on the choice of corrections and the year selected. The reason that Indiana's relative position improves is that the corrections adjust the ranks of ACT states such as Illinois, Michigan, Kentucky, and Ohio, downwards. The "good news" is that Indiana historically has not ranked near last place on SAT results, but the "bad news" is that Indiana still ranks in the bottom-half of the states.

Some Implications for Indiana's Education Policy Makers

The 1989 Indiana General Assembly mandated that Indiana school districts report average SAT scores of students in local newspapers each year. Each August Hoosiers will find reports published in local newspapers on their district's SAT scores. This information is now beginning to be

used by education stakeholders in Indiana communities to make the case for and against the need to improve education. It is fair to say that the problems of reporting and interpreting SAT scores at the school district level are as difficult, if not more so, than at the state level. One must ask whether reporting SAT scores at the district level provides sufficient and accurate information about student achievement in the district.

The issue is not so much whether to report SAT test score averages but whether the public interest is served by reporting district SAT scores without providing any interpretation and analysis. Education stakeholders and other citizens have common interests in developing facts and figures on education performance that inform them about Indiana education. The Indiana General Assembly should consider what kinds of district-level school performance measures supplemented with analysis and interpretation are needed to inform citizens and enhance public understanding about local education issues. Simply publishing district SAT scores in local newspapers does not inform the public about the performance of its schools.

The best that can be said for SAT scores is that they provide, with some corrections for known distortions, limited information about the verbal-math achievement of a small number of students (college-bound high school seniors). What Indiana lacks is an Education Performance Report Card that provides a comprehensive and informative view about education in Indiana. This report card should identify the characteristics of Indiana's schools that Hoosiers wish to know about—say, achievement test scores and graduation rates, revenues and expenditures, the number of at-risk and special needs children, the training and experience of the faculty and staff, and the social conditions of the area served. The information about these characteristics must be assembled, analyzed, and reported for each school district in an impartial way. When this is accomplished, the annual discussion about whether Indiana really is 47th on the SAT will cease to have relevance.

Endnotes

1. This classification of states is the approach used by the U.S. Department of Education "wall chart" reports (USDOE, 1984-1989). The state of Washington does not have large numbers of students taking either the SAT or ACT.

2. These corrections were developed by the author based on the average state SAT test scores reported in the "wall chart." Average ACT score by state were released for the years 1972, 1982, and 1984 through 1989 only and are not available for the remaining years. See Lehnen (1992).

For Additional Reading

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The Indiana Education Policy Center would like to hear from you about your reactions to this Policy Bulletin or other matters of education policy. Send your comments to the author at the Indiana Education Policy Center, Indiana University (IUPUI campus), School of Public and Environmental Affairs, 801 West Michigan Street. Indianapolis. Indiana 46202 (Telephone: 317/274-8783). Reprints of the article by Lehnen (1992) are available for $5.00. Make checks payable to Indiana University.

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